

Dr. Kessler's Summary of Opinions

- **Opinion 1:** Correcting 5 overstatements and excluding costs not paid by Counties from Plaintiffs' 5-year abatement plan reduces purported costs from \$864,558,347 to \$346,479,168.
- **Opinion 2:** Plaintiffs' 5-year abatement costs can reasonably be allocated to Defendants based on their challenged conduct.
 - Plaintiffs' 5-year abatement costs include costs caused by other entities (e.g., manufacturers, distributors, prescribers, and illegal drug cartels).
 - After correcting 5 overstatements and excluding costs the Counties will not incur, \$4,248,926 in 5-year abatement costs are allocable to Defendants, with \$324,322 allocable to Walmart, \$1,271,284 allocable to CVS, and \$2,653,319 allocable to Walgreens.

Opinion 1: Plaintiffs overstate 5-year abatement costs by \$518,079,179

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Overstatement 1: Plaintiffs overstate number of individuals with OUD

- Keyes estimates OUD populations using a mortality multiplier method: $N = \frac{d}{r} = \frac{d}{d/N}$
- Applied correctly, this is a valid method of estimating the size of a population:

$$\# \text{ people with OUD} = \frac{\# \text{ any drug related deaths of people with OUD}}{\text{any drug related death rate of people with OUD}}$$

- Keyes does not correctly apply the mortality multiplier method:
 - 1) Applies a flawed death rate of 0.52 per 100 person years
 - 2) Applies a mathematically incorrect mortality multiplier formula

Opinion 1: Plaintiffs overstate 5-year abatement costs by \$518,079,179

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Mistake 1: Keyes applies a flawed death rate of 0.52 per 100 person years

- Relies on Larney meta-analysis of 55 studies covering 623 study years
- 48 of 55 studies were from outside the United States
 - More than half of the 623 study years were from 2000 and earlier
- Combines death rates from studies measuring disparate populations, time periods, and impacts—a fundamentally flawed approach to multipliers
- The most recent U.S. study in Larney, (Larochelle et al.) reports a mortality rate of 2.10—more than four times the 0.52 mortality rate Keyes uses

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Mistake 2: Keyes applies a mathematically incorrect mortality multiplier formula

- Correct mortality multiplier formula:

$$\# \text{ people with OUD} = \frac{\# \text{ any drug related deaths of people with OUD}}{\text{any drug related death rate of people with OUD}}$$

- Keyes' mortality multiplier formula:

$$\# \text{ people with OUD} \neq \frac{\# \text{ any drug related deaths of anyone}}{\text{any drug related death rate of extramedical opioid users}}$$

- Keyes makes 2 critical mistakes in her formula:
 - A) Assumes "extramedical" or "misusers" = people with OUD
 - B) Assumes everyone who suffers a drug-related death must have OUD

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Mistake #2A: Keyes assumes “extramedical” or “misusers” = people with OUD.

- Relies on Larney article, which is based on studies of extramedical users and states that individuals in studies “did not need to be opioid dependent or have opioid use disorder to be included.”
- Extramedical users include anyone who misuses an opioid – that is, uses in a manner not directed by a doctor.
 - NSDUH (2019-20) tracks both misuse and OUD.
 - Opioid misusers in OH: 412,000
 - Individuals with OUD in OH: 119,000

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Mistake #2B: Keyes assumes everyone who suffers a drug-related death must have OUD.

- Cannot derive the OUD population by dividing # any-drug-related deaths *of any person, with or without OUD* by the any-drug-related death rate *of people with OUD*. Need # any-drug-related deaths *of people with OUD*.
- An example makes this point clear.
 - Keyes' formula would say if there are 1,000 students at Harvard from any HS, and 1% of Shaker Heights HS students go to Harvard, there must be 100,000 students at Shaker Heights HS.
 - This makes no sense. Need # students at Harvard *who went to Shaker Heights HS (any-drug-related deaths of people with OUD)* NOT # students at Harvard *who went to any HS (any-drug-related deaths of any person)*.

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Alternative to Keyes' Mortality Multiplier Method: NSDUH

- Comprehensive data source that specifically measures use, misuse, abuse, and diversion of opioids in the U.S. including state-level rates of OUD
- Based on annual in-person interviews with a random sample of 70,000 people (ages 12+)
 - Asks extensive questions about past/present substance use designed to allow survey authors to distinguish substance use disorders like OUD from mere misuse
 - Sensitive questions are posed through audio-computer self-interviewing to elicit accurate self-reported data
- Gold standard relied upon by state, federal, and local governments for public policy and by studies published in top peer-reviewed journals (*e.g.* JAMA, NEJM)

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Alternative to Keyes' Mortality Multiplier Method: NSDUH

- NSDUH data provides state-level rates of OUD, but not sub-state-level rates
 - OH's OUD rate in 2019-2020 is 1.210%
 - Rate of prescription OUD for sub-state areas including Lake (0.75%) and Trumbull (0.80%) was lower than OH's rate (0.81%)
 - This suggests that Lake and Trumbull OUD rates are lower than OH
 - Nonetheless, I applied OH's OUD rate to Lake's and Trumbull's populations

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Opinion 1: Plaintiffs overstate 5-year abatement costs by \$518,079,179

Keyes' mistakes result in an unreliable and overstated OUD population

	NSDUH 2019-2020 Data	Keyes' 2019 Estimate
Lake County	2,414	5,934
Trumbull County	2,048	7,560

Opinion 1: Plaintiffs overstate 5-year abatement costs by \$518,079,179

- **Overstatement 2:** Plaintiffs overstate # people with OUD who will obtain treatment.
 - Plaintiffs assume 40% will obtain treatment in 2021, rising to 60% by 2035.
 - In 2019-2020, 28.6% of people with OUD in OH received treatment. Nationwide, 9.8% of people with OUD felt a need for treatment, over and above those receiving it. This 9.8% includes people who felt a need for treatment, but made no effort to obtain it.
 - My opinion assumes that abatement pays for 38.4% of individuals with OUD to receive treatment – that is, every person with OUD who would be expected to receive or to feel a need for treatment.

Opinion 1: Plaintiffs overstate 5-year abatement costs by \$518,079,179

- **Overstatement 3:** Plaintiffs assume individuals with OUD will receive treatment 365 days per year.
 - TEDS shows OUD treatment length in Ohio on average is less than 365 days/year.

Treatment	Plaintiffs' Estimate	TEDS
Outpatient	365	152
Intensive outpatient	365	115
Residential	365	41
Inpatient	365	38

- **Overstatement 4:** Plaintiffs almost *double* the # of heroin users in NSDUH.

County	Plaintiffs' Estimate	NSDUH
Lake County	1,396	738
Trumbull County	1,440	762

- **Overstatement 5:** Plaintiffs rely on WV data to calculate the total number of pregnant women with OUD in Trumbull County – but not Lake County.

Opinion 1: Plaintiffs overstate 5-year abatement costs by \$518,079,179

Plaintiffs inflate 5-year abatement costs by including costs that are not paid by the Counties.

- For insured people with OUD who are in treatment
 - 91.6% of people with OUD in OH have health insurance.
- For medical care for complications (HCV, HIV, Endocarditis) attributable to OUD for insured people
 - 62.3% of heroin users in the U.S. had public or private health insurance.
- For pain treatment specialists for insured people with “high-impact” pain
 - 93% of people with “high-impact” pain in the U.S. have health insurance.

Opinion 1: Plaintiffs overstate 5-year abatement costs by \$518,079,179

Categories	Reductions	% Reduction	Total Cost
Plaintiffs proposed 5-year abatement costs	-		\$864,558,347
Correct overestimate of individuals with OUD	\$350,368,567	41%	\$514,189,780
Correct overestimate of those with OUD who may actually receive treatment	\$18,806,396	43%	\$495,383,384
Correct overestimate of treatment length	\$95,210,634	54%	\$400,172,750
Correct overstatement of number of heroin users	\$3,021,347	54%	\$397,151,403
Correct erroneous reliance on WV data	\$2,308,422	54%	\$394,842,981
Exclude treatment cost for insured people with OUD who are in treatment	\$34,681,664	58%	\$360,161,317
Exclude cost for medical care for complications (HCV, HIV, Endocarditis) attributable to OUD for insured people	\$2,114,943	59%	\$358,046,374
Exclude costs of pain treatment specialists for insured people	\$11,567,206	60%	\$346,479,168

Opinion 1: Plaintiffs overstate 1-year abatement costs by \$87,194,708

Categories	Reductions	% Reduction	Total Cost
Plaintiffs proposed 1-year abatement costs	-		\$155,197,257
Correct overestimate of individuals with OUD	\$59,643,177	38%	\$95,554,080
Correct overestimate of those with OUD who may actually receive treatment	\$1,181,376	39%	\$94,372,704
Correct overestimate of treatment length	\$16,977,769	50%	\$77,394,935
Correct overstatement of number of heroin users	\$534,476	50%	\$76,860,459
Correct erroneous reliance on WV data	\$134,799	51%	\$76,725,660
Exclude treatment cost for insured people with OUD who are in treatment	\$6,100,997	54%	\$70,624,663
Exclude cost for medical care for complications (HCV, HIV, Endocarditis) attributable to OUD for insured people	\$374,135	55%	\$70,250,528
Exclude costs of pain treatment specialists for insured people	\$2,247,979	56%	\$68,002,549

Opinion 2: There is a reasonable way to allocate costs

- **Plaintiffs do not allocate costs among the numerous factors that are alleged to have caused the public nuisance requiring abatement.**
 - Manufacturers, distributors, prescribers, the government, diverters, other pharmacies' dispensing, and illegal drug cartels
 - "Demand" factors such as deindustrialization, un- or underemployment, lack of opportunity, disability, pain, or work injury
 - "Supply" factors other than prescription opioids, such as the price of heroin and the rise of fentanyl
- **My 3-Step model allocates costs to Defendants proportional to their red-flagged prescriptions (*i.e.*, challenged conduct), as specified by Dr. McCann.**
 - Isolates Defendants' challenged conduct from conduct Plaintiffs do not challenge

Opinion 2: There is a reasonable way to allocate costs

- **Step 1:** Estimate regression models to determine portion of opioid-related mortality associated with prescription-opioid shipments.
 - Allow separate models for prescription and illicit opioids and flexible lag effects.
- **Step 2:** Calculate opioid-related mortality allocable to flagged dispensing.
 - Dr. McCann calculates the flagged MME filled by each Defendant that Plaintiffs contend should not have been dispensed.
 - Use Step 1 estimate to calculate opioid-related mortality allocable to Defendants' challenged conduct.
 - Calculate % of opioid-related mortality allocable to Defendants' challenged conduct.
- **Step 3:** Calculate abatement costs allocable to Defendants' challenged conduct.
 - Apply % from Step 2 to Total Abatement Costs.
 - Calculate opioid-related harm allocable to Defendants' challenged conduct based on the corrected present value of the plan's costs.

5-year abatement costs allocable to Defendants' challenged conduct

- Plan's 5-year uncorrected cost: Lake \$375,140,822; Trumbull \$489,417,525**

Defendant	Lake County Harm Allocable to Challenged Conduct	Lake County Allocable Cost	Trumbull County Harm Allocable to Challenged Conduct	Trumbull County Allocable Cost
Walmart	0.176%	\$661,460	0.031%	\$152,036
CVS	0.445%	\$1,669,301	0.308%	\$1,506,881
Walgreens	0.693%	\$2,598,866	0.821%	\$4,018,147

- Plan's 5-year corrected cost: Lake \$149,175,316; Trumbull \$197,303,852**

Defendant	Lake County Harm Allocable to Challenged Conduct	Lake County Allocable Cost	Trumbull County Harm Allocable to Challenged Conduct	Trumbull County Allocable Cost
Walmart	0.176%	\$263,031	0.031%	\$61,292
CVS	0.445%	\$663,800	0.308%	\$607,484
Walgreens	0.693%	\$1,033,443	0.821%	\$1,619,876

5-year abatement costs allocable to Defendants' challenged conduct

Defendant	Allocable Cost Based on Plaintiffs' Uncorrected Cost	Allocable Cost Based on Corrected Cost
Walmart	\$813,496	\$324,322
CVS	\$3,176,181	\$1,271,284
Walgreens	\$6,617,013	\$2,653,319